Thus, in any case,

$$(a + b)(a - b) \equiv 0 \pmod{8},$$

a and b each belong to one of the types $3k$, $3k + 1$, $3k + 2$.

If either be $3k$, then

$$ab \equiv 0, \text{ mod. } 3.$$

If both be of type $3k + 1$, or $3k + 2$, then

$$a - b \equiv 0, \text{ mod. } 3.$$

If one be of type $3k + 1$ and the other $3k + 2$, then

$$a + b \equiv 0, \text{ mod. } 3.$$

Thus in any case

$$(a + b)ab(a - b) \equiv 0 \pmod{24}.$$

QUESTIONS AND DISCUSSIONS.

Edited by U. G. Mitchell, University of Kansas.

NEW QUESTIONS.

29. While studying the problem of two equal rough bodies, connected by an inelastic wire, resting on an inclined plane, Professor Clifford N. Mills of South Dakota State College met the following interesting expression. If $1/a$ and $1/a + 1$ are the coefficients of friction, the tension of the wire when the bodies are about to descend becomes a multiple of $1/a[1/a + 1/a + 1]$. This, when simplified, becomes $(2a + 1)/2a(a + 1)$. If $2a + 1$ and $2a(a + 1)$ represent the base and altitude of a right triangle the hypothenuse is $2a^2 + 2a + 1$. Therefore this gives a series of numbers which satisfy the relation $x^2 + y^2 = z^2$, if a is given any value whatsoever. Professor Mills desires to know if this will give all the integers which satisfy the condition that the sum of the squares of two integers equals the square of an integer.

REPLIES.

23. What should be done with the theory of limits in elementary geometry? Should the recommendation of the National Committee of Fifteen be universally adopted? If not, what better disposition of the subject can be made?

Reply by R. M. Matthews, Riverside, California.

In elementary euclidean plane geometry the theory of limits is used at four places. The last of these is for the evaluation of a particular sequence which defines a definite limit π and so is different from the other three which are the theorems fundamental to proportion and the comparison of areas. The first is, "In a circle, central angles are proportional to their intercepted arcs." It depends upon the theorem that equal central angles intercept equal arcs, a relation which is established by congruence. The second is, "A set of parallel lines intercept proportional segments on all transversals." It depends upon the theorem that parallels which intercept equals on any transversal intercept equals on every transversal, a relation also established by congruence. The third is, "Rectangles are proportional to the products of their bases and altitudes"